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COATS & BENNETT, PLLC
P O BOX 5
RALEIGH, NC 27602

EXAMINER	
CORSARO, NICK	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/915,896	DENT, PAUL WILKINSON	
	Examiner	Art Unit	
	Nick Corsaro	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 0203*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,8,10,12-25,34,37-43,46,51-60,63 and 64* is/are rejected.

7)☒ Claim(s) *5,6,9,11,26-33,35,36,44,45,47-50,61 and 62* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7, 9*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

RESPONSE TO AMENDMENT

Response to Arguments

1. Applicant's arguments filed 12/08/2003 have been fully considered but they are not persuasive.

In response to the applicants arguments concerning claims 1-15, the applicants features in the claims wherein a method of employing coherent transmit diversity in a wireless communication network, the method comprising: forming a plurality of transmit signals, each comprising a combination of information signals intended for different ones of a plurality of wireless receivers, such that, at each one of said wireless receivers, the intended information signals in the plurality of transmit signals add while the other information signals cancel; and coherently transmitting said transmit signals from said plurality of transmitters over different propagation channels to said plurality of receivers, reads on Wallace in view of Koga as follows.

Wallace is disclosing a transmitting based on channel state information, wherein on the transmission side Wallace performs transmission of multiple signals from multiple antennas each intended for a receiver, the signals preconditioned based on the channel environment between the transmitter and receiver. Wallace discusses that the signals are diversity signals formed in into a coherent beam wherein at the receiver the redundant signals intended for a particular receiver are not only combined, in frequency, time. Therefore, Wallace discloses coherent transmit diversity, and wherein the signal is intended for a receiver of a plurality of receivers and where the signals are summed at the receiver, i.e., the signals intended for the receiver are summed. Wallace did not specifically show that signals not intended for the receiver are subtracted, however the limitation is broad, and reads upon the secondary reference Koga, where Koga shows it is

obvious to one skilled in the art to show that in such summing diversity receivers it is common to adjust the signals receiver from different antennas such that signals not intended such as interference from other signals intended for other mobiles to be subtracted.

In response to the applicants argument, from paragraph 2 of the response, that there must be motivation in the prior art to combine the references, the argument is not persuasive, in that the motivation the was taken from the secondary reference Koga whom says that it is this could be done to compensate for fading, a and further the motivation does not have to be from the references, but can be from the prior art or a universal motivation based on what one skilled in the art would do.

In response to the applicants arguments from paragraphs 3-7, as discussed above Wallace does show transmit diversity in a coherent beam wherein the transmissions are from a base station in a CDMA system and therefore, are intended for many receivers the receivers first identifying based on an orthogonal code and further using the diversity reception, where redundancy signals are summed. With respect to Wallace it is well known that the signals in a diversity receiver are summed, and that others are canceled base on the theory such receivers. Wallace fails to disclose this fact and is modified by Koga to show the signals are subtracted or canceled. Koga says the interference signals re cancelled, however, in a CDMA signals intended for other receivers are viewed as interference. Therefore, the limitation of canceling reads on Wallace in view of Koga.

In response to the applicant's arguments in paragraph 8, that Koga makes inoperative, the argument is not persuasive in that the limitation is broad and to merely say canceling can be read

as interpreted in Koga where Koga is teaching the exact same kind of receiver as Wallace so that it would operate.

In response to the applicants arguments in paragraph 9-10, the applicant argues that the examiner is required to explain such that one skilled in the art could see how to modify, and the examiner has not done so, is not persuasive in that one skilled in the art can see how to modify one diversity receive with another based on basic wireless knowledge, the examiner need not have to show a schematic of how to modify because one skilled in the upon reading the references can make such modifications. Recall that if one were skilled in the art the basics of circuit design would not need to be shown.

With regard to the applicants regarding claims 15-17, beginning in paragraph, 11, wherein the applicants features in the claims are, a method of transmitting signals in a wireless communication network from one or more transmitters to a plurality of receivers, the method comprising: receiving a plurality of information signals at a transmit processor, each information signal intended for a different receiver; generating a plurality of transmit signals by forming weighted, or pre-filtered, combinations of said information signals based on channel estimates for propagation paths between said one or more transmitters and said plurality of receivers; and coherently transmitting said transmit signals from said one or more transmitters to said plurality of receivers reads upon Wallace in view of Harrison as follows.

Wallace as discussed above show transmit coherent diversity wherein a diversity receiver combines the received signals, by summing them to generate a receive signal. Wallace did not show weighting or pre-filtering however does show preconditioning, where weighting or filtering logically would do that. Harrison shows such weighting or filtering.

In response to the applicants arguments in paragraph 11, that examiner bases the rejection on Wallace in view of Harrison and Koga, the argument is not persuasive in that Koga is mistakenly place in the obvious statement of the 103, however it is clear from the heading of the 103 and paragraphs 1 and 2 of the 103 that only Harrison is used to modify, therefore, the argument is not persuasive.

In response to the applicant's arguments in paragraph 12-14, where the applicant argues Koga, the argument is moot because the action only shows Wallace modified by Harrison. A mistype in the obvious statement may imply that both where modified however it is clear from the heading and body that only one modification is made.

With regard to the applicants arguments in paragraphs 12-14 regarding Harrison, Wallace shows the main features of the claims, i.e., coherent transmit and receive diversity with pre-conditioned signals that are summed at the receiver. Harrison only modifies to show, the pre-weighting, and pre-filtering, along with the subtractions.

With regard to the applicants arguments in paragraphs 12-14 regarding combination and motivation, and operability, Harrison can be used to modify because the receivers are of same type and the motivation is given in the background of Harrison.

In response to the applicants arguments in paragraph 15-20, the applicant argues that the signals are not coded based on frequency response to the channels, however, Wallace shows that the signals are pre-conditioned based on feed back from the receiver about the receive signal and thus the frequency or channel response.

Regarding the dependent claims, the features are shown via the primary and secondary references cited in the action, and as modified by Raleigh or Debak, where Raleigh and Debak

show motivations and can be used because they are in the same field and teaching nearly identical systems.

Therefore, the argued features are written broad such that they read upon the cited references or are claiming the same limitations as the cited references.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 7, 10, 13, and 14, are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (6,473,467) in view of Koga et al. (6,577,686).

Consider claim 1, Wallace discloses a method of employing coherent transmit diversity in a wireless communication network (see col. 4 lines 48-68, col. 7 lines 46-67, col. 6 lines 1-67, col. 7 lines 1-55, col. 8 lines 15-67, col. 10 lines 28-67, col. 11 lines 19-57, and col. 21 lines 15-44 where Wallace discloses a coherent beam with transmit and receiver diversity). Wallace discloses forming a plurality of transmit signals, each comprising a combination of information signals intended for different ones of a plurality of wireless receivers (see col. 4 lines 35-47, col. 8 lines 53-67, col. 9 lines 4-67, col. 10 lines 27-67, and col. 11 lines 1-5). Wallace discloses such that, at each one of said wireless receivers, the intended information signals in the plurality of transmit signals add (see col. 24 lines 53-61, col. 24 lines 25-54). Wallace discloses coherently transmitting said transmit signals from said plurality of transmitters over different propagation channels to said plurality of receivers (see col. 4 lines 47-64, col. 5 lines 47-67, col.

6 lines 1-67, col. 10 lines 28-67, col. 11 lines 19-57, and col. 21 lines 15-44, where Wallace is discussing transmitting multiple user information over multiple sub-channels using diversity and beam forming, therefore the information is coherently transmitted in coherent beams and over coherent channels using diversity).

Wallace discloses a diversity receiver wherein intended signals are added and where typically non-intended signals can be cancelled (see col. 53-61). Wallace however does not specifically disclose the other information signals cancel. Koga teaches the other information signals cancel (see col. 1 lines 54-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and have the other information signals cancel, as taught by Koga, thus allowing using diversity reception to suppress co-channel interference, as discussed by Koga (col. 1 lines 40-53).

Consider claim 2, Wallace discloses maintaining a set of channel estimates for propagation channels between each one of said transmitters and each one of said wireless receivers (see col. 9 lines 4-16 and col. 13 lines 22-67).

Consider claim 7, Wallace discloses maintaining a set of channel estimates for propagation channels between each one of said transmitters and each one of said wireless receivers comprises periodically updating a channel estimate matrix comprising matrix elements characterizing one or more propagation paths between each said transmitter and each said wireless receiver (see col. 2 lines 25-50 and col. 14 lines 30-40).

Consider claim 10, Wallace discloses coherently transmitting said transmit signals from said plurality of transmitters over different propagation channels comprises coherently

transmitting said plurality of transmit signals from respective ones of a plurality of spaced apart transmit antennas (see col. 4 lines 35-61).

Consider claim 13, Wallace discloses employing coherent transmit diversity in a wireless communication network comprises employing coherent transmit diversity in a cellular communications network (see col. 5 lines 46-67, col. 6 lines 1-67).

Consider claim 14, Wallace discloses forming a plurality of transmit signals to be coherently transmitted from a plurality of transmitters as combinations of information signals intended for different ones of a plurality of wireless receivers (see col. 4 lines 35-64).

1. Claims 3, 4, and 8, are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace in view of Koga as applied to claim 1 above, and further in view of Harrison et al. (6,434,366).

Consider claim 3 and 8, Wallace discloses the method, as modified by Koga, above. Wallace further discloses forming a plurality of transmit signals to be coherently transmitted from a plurality of transmitters as combinations of information signals intended for different ones of a plurality of wireless receivers (see col. 4 lines 48-68, col. 7 lines 46-67, col. 6 lines 1-67, col. 7 lines 1-55, col. 8 lines 15-67, col. 10 lines 28-67, col. 11 lines 19-57, and col. 21 lines 15-44 where Wallace discloses a coherent beam with transmit and receiver diversity). Wallace discloses for each said transmit signal: determining a set of preconditions based on the channel estimates for propagation paths between a transmitter from which said transmit signal is to be transmitted and each one of said plurality of wireless receivers (see col. 9 lines 4-16, col. 13 lines 22-67 and col. 14 lines 1-40). Wallace discloses preconditioning said information signals in respective ones of said set of pre-conditioners to form individually preconditioned information

signals; and summing said individually filtered information signals to form said transmit signal (see col. 9 lines 4-16, col. 13 lines 22-67, col. 14 lines 1-40, col. 14 lines 40-67, col. 24 lines 25-67 and col. 25 lines 1-30).

Wallace discloses preconditioning the signals with processors that can be used to form digital filters (see col. 25 lines 1-30), however Wallace and Koga do not specifically disclose determining a set of filters based on the channel estimates for propagation paths and filtering said information signals in respective ones of said filters to form individual filtered information signals. Harrison teaches determining a set of filters based on the channel estimates for propagation paths and filtering said information signals in respective ones of said filters to form individual filtered information signals (see col. 8 lines 6-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace and Koga, and determining a set of filters based on the channel estimates for propagation paths and filtering said information signals in respective ones of said filters to form individual filtered information signals, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claim 4, Wallace discloses generating a channel estimate matrix comprising a plurality of matrix elements, each said matrix element characterizing the propagation channels between one of said transmitters and one of said wireless receivers (see col. 13 lines 22-67).

2. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace in view of Koga as applied to claim 1 above, and further in view of Raleigh et al. (6,144,711).

Consider claim 12, Wallace and Koga disclose diversity, however do not specifically disclose different polarizations. Raleigh teaches different polarizations (see figure 5 and col. 11 lines 1-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace and Koga, and use different polarizations, as taught by Raleigh, thus allowing signals to be received in a fading environment.

3. Claims 15-17, 19-24, 41-43, 46, 51-55, 58-60, 63, and 64, are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (6,473,467) in view of Harrison et al. (6,434,366).

Consider claim 15, Wallace discloses method of transmitting signals in a wireless communication network from one or more transmitters to a plurality of receivers (see col. 3 lines 34-54, and col. 4 lines 35-65). Wallace discloses receiving a plurality of information signals at a transmit processor, each information signal intended for a different receiver (see col. 21 lines 15-44, col. 10 lines 28-65, and col. 11 lines 19-60). Wallace discloses generating a plurality of transmit signals by forming pre-conditioned combinations of said information signals based on channel estimates for propagation paths between said one or more transmitters and said plurality of receivers, wherein said pre-conditioned combinations are formed in consideration of the propagation paths such that at each receiver the information intended for that receiver tend to add (see col. 2 lines 25-50; col. 8 lines 58-67, col. 9 lines 1-15, col. 13 lines 2-67, col. 14 lines 1-40, and col. 24 lines 53-61, where Wallace discusses pre-conditioning each signal element and forming a combination of the preconditioned elements, and where at the signals are combined over time, frequency, and space, thus reception is performed thus adding the signals). Wallace discloses coherently transmitting said transmit signals from said one or more transmitters to said

plurality of receivers (see col. 4 lines 47-64, col. 5 lines 47-67, col. 6 lines 1-67, col. 10 lines 28-67, col. 11 lines 19-57, and col. 21 lines 15-44, where Wallace is discussing transmitting multiple user information over multiple sub-channels using diversity and beam forming, therefore the information is coherently transmitted in coherent beams and over coherent channels using diversity).

Wallace disclose preconditioning the signals with coefficients, and adding the signals at the receiver using combining, wherein such a system the non-intended signals logically tend to cancel (see col. 13 lines 3-67, col. 14 lines 1-55, and col. 24 lines 54-61, where Wallace is discussing a combining redundant information thus information intended and thus information non-redundant is excluded or canceled) where coefficients amount to weighting, however, Wallace does not specifically disclose forming weighted combinations, and the information signals not intended for the receiver tend to cancel . Harrison teaches forming weighted combinations, and where information signals not intended for the receiver tend to cancel (see col. 7 lines 14-67, col. 8 lines 1-67, col. 9 lines 30-67, and col. 15 lines 10-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and form weighted combinations, where information signals not intended for the receiver tend to cancel, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claims 41, Wallace discloses a method of reducing interference at one or more receivers (see col. 2 lines 25-50, col. 5 lines 47-67, col. 7 lines 45-55, col. 8 lines 15-67, and col. 9 lines 1-15). Wallace discloses preconditioning information signals for one or more receivers

using channel estimates representing propagation channels between two or more transmitters and said one or more receivers to form two or more transmit signals (see col. 21 lines 8-67, col. 22 lines 7-65, col. 9 lines 4-15, col. 2 lines 25-50; col. 8 lines 58-67, col. 9 lines 1-15, col. 13 lines 2-67, col. 14 lines 1-40, and col. 24 lines 53-61, where Wallace discusses preconditioning each signal element and forming a combination of the preconditioned elements and summation of the signals through, time, frequency, and space). Wallace discloses said transmit signals combine at said one or more receivers to reduce interference between information signals (see col. 24 lines 53-61, col. 24 lines 25-67, col. 25 lines 1-56, col. 8 lines 15-67). Wallace discloses transmitting a different one of said transmit signals from each one of said two or more transmitters (see col. 4 lines 35-64, col. 10 lines 28-65, col. 13 lines 3-35, and col. 21 lines 8-44).

Wallace discloses preconditioning the signals with coefficients (see col. 13 lines 3-67 and col. 14 lines 1-55), where coefficients typically can be realized through filtering or amplifying, however, Wallace does not specifically disclose pre-filtering. Harrison teaches pre-filtering, (see col. 7 lines 14-67, col. 8 lines 6-67, col. 8 lines 1-67, col. 9 lines 30-67, and col. 15 lines 10-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and pre-filter, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claim 55, Wallace discloses a method of reducing interference at one or more receivers (see col. 2 lines 25-50, col. 5 lines 47-67, col. 7 lines 45-55, col. 8 lines 15-67, and col. 9 lines 1-15). Wallace discloses preconditioning information signals for one or more receivers using channel estimates representing propagation channels between two or more transmitters and

said one or more receivers to form two or more transmit signals, wherein said transmit signals are formed by pre-conditioning in consideration of the propagation paths such that at each receiver the information signals intended for the receiver tend to add (see col. 21 lines 8-67, col. 22 lines 7-65, col. 9 lines 4-15, col. 2 lines 25-50; col. 8 lines 58-67, col. 9 lines 1-15, col. 13 lines 2-67, col. 14 lines 1-40, and col. 24 lines 53-61, where Wallace discusses preconditioning each signal element and forming a combination of the preconditioned elements and summation of the signals through, time, frequency, and space). Wallace discloses said transmit signals combine at said one or more receivers to reduce interference between information signals (see col. 24 lines 53-61, col. 24 lines 25-67, col. 25 lines 1-56, col. 8 lines 15-67). Wallace discloses transmitting a different one of said transmit signals from each one of said two or more transmitters (see col. 4 lines 35-64, col. 10 lines 28-65, col. 13 lines 3-35, and col. 21 lines 8-44).

Wallace discloses preconditioning the signals with coefficients (see col. 13 lines 3-67 and col. 14 lines 1-55), where coefficients typically can be realized through filtering or amplifying, however, Wallace does not specifically disclose pre-filtering, and where information signals not intended for the receiver tend to cancel. Harrison teaches pre-filtering, where information signals not intended for the receiver tend to cancel (see col. 7 lines 14-67, col. 8 lines 6-67, col. 8 lines 1-67, col. 9 lines 30-67, and col. 15 lines 10-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and pre-filter, wherein information signals not intended for the receiver tend to cancel, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claim 46, Wallace discloses a method of transmitting signals in a wireless communication network from a plurality of transmitting stations to a plurality of receivers (see col. 4 lines 35-64). Wallace discloses forming a matrix of elements, each element being a multi-valued element, describing the propagation path from one of said transmitting stations to one of said receivers (see col. 9 lines 4-16 and col. 13 lines 8-67). Wallace discloses inherently forming an inverse of said matrix comprising an ad-joint matrix and a determinant (see col. 13 lines 50-67, and col. 14 lines 1-27, where Wallace shows the matrix equation for determining preconditioning coefficients and inverse matrices are formed using the ad-joint and determinant). Wallace discloses determining the frequency response from a signal input in said communications network to a receiver for which the signal applied to said signal input is intended (see col. 13 lines 8-35). Wallace discloses assuming said inverse matrix is used for preconditioning and combining said applied signals to obtain signals for transmission from respective transmitting stations (see col. 9 lines 4-16. col. 13 lines 8-67, col. 14 lines 1-67). Wallace discloses forming said applied signal based on information to be transmitted to said intended receiver and said frequency response so that the information is coded in said applied signal to produce a spectrum of the applied signal that is efficient for transmitting said information to said intended receiver (see col. 2 lines 25-50, col. 9 lines 4-15, and col. 14 lines 30-50).

Wallace discloses preconditioning the signals with coefficients (see col. 13 lines 3-67 and col. 14 lines 1-55), where coefficients typically can be realized through filtering or amplifying, however, Wallace does not specifically disclose pre-filtering. Harrison teaches pre-filtering (see col. 8 lines 6-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and pre-filter, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claim 51, Wallace discloses a wireless communication network (see abstract lines 1-3). Wallace discloses a transmitter operative to transmit a plurality of transmit signals to a plurality of receivers (see col. 2 lines 25-50). Wallace discloses a transmit processor operative to form said transmit signals as preconditioned combinations of individual information signals intended for respective ones of said plurality of receivers by preconditioning said information signals using channel estimates representing propagation channels between said transmitter and said receivers, wherein said pre-conditioned combinations are formed in consideration of the propagation channels such that at each receiver the information signals intended for the receiver tend to add (see col. 9 lines 4-15, col. 13 lines 3-67, col. 14 lines 1-40, col. 21 lines 7-44, and col. 24 lines 53-61).

Wallace disclose preconditioning the signals with coefficients (see col. 13 lines 3-67 and col. 14 lines 1-55), where coefficients amount to weighting, however, Wallace does not specifically disclose forming weighted combinations, wherein the information signals not intended for the receiver tend to cancel. Harrison teaches forming weighted combinations where the information signals not intended for the receiver tend to cancel (see col. 7 lines 14-67, col. 8 lines 6-67, col. 8 lines 1-67, col. 9 lines 30-67, and col. 15 lines 10-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and form weighted combinations, where the

information signals not intended for the receiver tend to cancel, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claim 16, 17, 19, 58, Wallace discloses one or more transmitters comprise a plurality of transmitters, and wherein coherently transmitting said transmit signals from said one or more transmitters to said plurality of receivers comprises coherently transmitting a different one of said plurality of transmit signals from each one of said plurality of transmitters (see col. 4 lines 35-63, col. 10 lines 27-67, and col. 21 lines 8-44).

Consider claims 20-24, 52-54, Wallace discloses using orthogonal arrays transmissions and preconditioning with CDMA (see col. 4 lines 35-64 and col. 10 lines 27-65). Wallace does not specially disclose weighting specific CDMA codes. Harrison teaches weighting specific CDMA codes (see col. 3 lines 27-67, col. 4 lines 1-67, and col. 5 lines 45-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and weight specific codes, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claims 42, 43, 59, and 60, Wallace discloses pre-conditioning information signals for one or more receivers using channel estimates representing propagation channels between two or more transmitters and the receiver to form two or more transmit signals comprises forming transmit pre-conditioners using a channel estimate matrix representing a set of propagation channels between said transmitters and said one or more receiver (see col. 9 lines 4-16, col. 13 lines 2-67 col. 14 lines 1-50, col. 21 lines 15-45, col. 22 lines 20-30, col. 24 lines

62-67, col. 25 lines 1-30). Wallace discloses pre-conditioning (col. 9 lines 4-16, col. 25 lines 1-30) where preconditioning is normally done by, digital filtering realized through processors, amplifying, or mixing, however, Wallace does not specifically disclose pre-filtering. Harrison teaches pre-filtering (see col. 8 lines 4-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and Pre-filter, as taught by Harrison, thus allowing the system to not use high power per user pilots to estimate propagation characteristics, as discussed by Harrison (col. 1 lines 44-57, col. 2 lines 30-41).

Consider claim 63, Wallace discloses preconditioning the signals using a transmit processor (see col. 21 lines 8-45, col. 22 lines 19-40, and col. 25 lines 1-30). Wallace does not specifically disclose the transmit processor is a digital signal processor. Official notice is taken that both the concept and advantages of using a digital signal processor are well known and expected in the art for processing signals allowing software realization of analog components, such as filters allowing manufactures to easily change the functions of a device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace, and use a digital signal processor for the transmit processor, thus allowing a software realization of the preconditioning hardware for lower cost and easier manufacturing.

Consider claim 64, Wallace discloses preconditioning the signals using a transmit processor inherently comprising one or more memory elements (see col. 21 lines 8-45, col. 22 lines 19-40, and col. 25 lines 1-30).

4. Claims 18, 25, 34, 37-40, 56, and 57, are is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace in view Harrison as applied to claim 15 above, and further in view of Raleigh et al. (6,144,711).

Consider claim 18, 37-40, 56, and 57, Wallace and Harrison disclose diversity, however do not specifically disclose different polarizations. Raleigh teaches different polarizations (see figure 5 and col. 11 lines 1-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace and Harrison, and use different polarizations, as taught by Raleigh, thus allowing signals to be received in a fading environment.

Consider claim 25 and 34, Wallace discloses, the method and system, as modified by Harrison, wherein channel responses are determined and signals preconditioned using weights and matrices (see Wallace col.. 13 lines 3-67, Harrison col. col. 5 lines 1-67 and col. 8 lines 6-65). Wallace and Harrison do not specifically disclose a polynomial in the operator z. Raleigh teaches a polynomial in the operator z (see col. 14 lines 14-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace and Harrison, and have a polynomial in the operator z, as taught by Raleigh, thus allowing a complex fading path to be defined.

5. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace in vie of Harrison as applied to claim 22 above, and further in view of Dabak et al. (6,594,473).

Consider claim 23, Wallace and Harrison do not specifically disclose using TDMA. Dabak teaches TDMA (see col.. 14 lines 44-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Wallace and Harrison, and use TDMA, as taught by Debak, thus allowing the method to conform to other types of radio frequency air interface standards.

Allowable Subject Matter

6. Claims 5, 6, 9, 11, 26-33, 35-36, 44, 45, 47-50, 61, and 62, objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Nick Corsaro at telephone number (703) 306-5616.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung, can be reached at (703) 308-7745. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth, Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 customer Service Office whose telephone number is (703) 306-0377.

Nick Corsaro
Primary Examiner